E1955
v4

D R A F T

Sustainable Forest Management and Rural Development Project

A Review on the PFA selection criteria
and new PFAs identification in the Lao PDR
22 July 2008

Post Graduate & Research Division

Faculty of Forestry, National University of Laos

1.   Background

Currently, there are 54 Production Forest Areas (PFA) in Lao PDR, but only 37 of them have been recognized by the government (under the PM Decree No: 27/PM and 321/PM). Establishing of PFAs was to manage and ensure the sustainability of forest exploitation and management. On the 22nd of May n 2002, the Prime Minster's Decree No: 59/PM was issued, it set a guideline for PFAs identifications. Subsequently, the Regulation No: 0204/MAF and Agreement No: 0108/MAFwas declared, by the Ministry of Agriculture and Forestry, to set specifically criteria in selection PFAs.

Although these criteria were carefully made and improved to be flexible with a local operational circumstance, experiences showed that some of them were still confusable and inconsistent. In addition, a lack of precise and accurate data more likely became barriers and constrains in a real implementation of identifying PFAs. This leads to produce an improper output of the timber production as well as difficult to make properly management plan.

The government would like to extent the PFA scheme to other parts of the country. The expansion will support by the World Bank through the SUFORD project. Based on lesson learnt from the SUFORD project evaluation, World Bank suggested reviewing on the existing criteria to use for the new PFAs selection in order to improve and fulfill any pieces of improper outcomes.

This paper consists of two main parts; the first part discuss about the finding of criteria review for the   PFAs selection in Lao PDR and the second part briefly describing about the new selected PFAs in five provinces, including Xayabouly, Vientiane, Bolikhamsay, Sekong and Attapeu.

2.   Data Collection

In addressing to the review objective, the existing documents such as degree, regulation and agreement concerning to PFAs establishment in Lao PDR were gathered and reviewed by a study team from the Faculty of Forestry (FoF). Most of those related materials derived from the Forest Inventory and Planning Division (FIPD) and the Technical Division, under the Department of Forestry. In addition, a discussion with the FIPD officer provided a useful source of data into this review.

3. Findings

The findings of the PFA criteria review can be summarized as following:

3.1 The Development of PFA Regulation and Criteria

3.1.1 The PM's Decree on the sustainable PFA management

In 2002, the PM Decree No: 59/PM. 2002 on the Sustainable Management of Production Forest was issued. This decree sets basic principle for establishing of PFAs in Lao PDR. It also addresses the guideline for the PFAs selection as well. The guidelines are as follows.

1. PFAs must be the forest and forestland with a suitable geographical condition, it must not cover any other land designated for the national defense and other use purposes.

2. It must be covered by the forest that can be harvested for timber productions and it must be ensured the sustainability of the timber products in both the current and future.

3. It must be an appropriate area in size that can supply timber productions and generate continuous profits. The Ministry of Agriculture and Forestry has the role to setting up detail criteria and measures for a field implementation.

3.1.2 The Regulation and criteria developed by the Ministry of Agriculture and Forestry (MAF)

After the PM Decree 59/PM in 2002 was issued, the Ministry of Agriculture and Forestry issued the Regulation No: 0204/MAF, on 03rd October, 2003 to apply and implementing PFAs selection around the country. The criteria defined as following:

1. PFAs should not cover land designated for protection, conservation or corridor area as well as areas for the national defense purpose. It should be excluded infrastructural development areas such as industrial land, permanent agriculture land, cultural and tourism areas and communication land.

2. PFAs must not cover forest and agriculture land that already allocated to villagers for management and use

3.   A PFA might cover many villages, districts or province boundaries

4.   PFAs must be located far from the national boundaries at least 5 km

5.   It must be an area of a minimum of 5,000 ha

Two year later, the Agreement No: 0108/MAF. 2005 was issued, they are as below:

1. It should cover an area of 5,000 ha; if it is less, it must consist of other small area of a minimum 500 ha nearby. Then, they can be grouped together as one PFA.

2. PFAs should not include the national protection or conservation forest as well as area designated for the national defense, a large infrastructural development areas such as reservoirs and other types of infrastructure development or a permanent agriculture.

3. It should be well-defined, easily-recognized boundaries; such as mountain ridge, rivers, roads or others. It should be located from national boundaries at least 5 km. However, this could be adjustable and flexible based on a real local condition.

4. PFAs should contain currently at least 20% harvestable area and at least 60% in future. And the rest part could be covered by village land use area such as village protect forest, conservation forest and utilization forest, rice field, pond and home land with slope of over 33 degree or 60 %.

3.1.3 The recommended criteria for PFAs selection from World Bank

As a result of the monitoring activities on the implementation of SUFORD project, the World Bank suggested to revised the existing PFA selection criteria and recommended to apply new criteria as listed bellows:

* PFAs must contain relatively concentrated blocks of Evengreen/Semi-evengreen forests of ≥7,500 ha and slop degree ≤ 25 degree

* Blocks to constitute at least 40% of PFA

* Potentially operable forests must be within 15 km of an existing district road

* PFAs within 75 km by district road of existing processing facility (economic feasibility, government management and control)

* The project is not restricting access to traditional resources or results in potentially negative impacts to local communities

4.   Some perspectives on the PFA Regulation and Criteria

Based on the review, it is found that the Regulation related to the PFAs selection is appropriate. Nevertheless, some of the site selection criteria in the Agreement needs to be upgraded to make it consistency with the existing regulation. In order to update and improve for new criteria, it needs to have an assessment of the procedure practice and experience learnt. But it absolutely could not be carried out by this stage. Some perspectives on the existing criteria are discussed as below:

- ❖ The development of the Agreement No: 0108 of the MAF in 2005 didn't refer to the Regulation No: 0204 issued in 2003. It seems slightly lost connection or even more likely created confusion.

- ❖ The Regulation No: 0204 enhanced and respected the importance of the biodiversity. For instance, PFAs must not cover the conservation forest or protection and also the **corridor area** which are significant natural habitats of wildlife population. In contrast, a corridor area was not mentioned and preserved by the PFA criteria in the Agreement No: 0108. Nevertheless, it provided a fully clarification on natural geographical characteristics, for example mountain ridge, river and roads which are basic facilitating and convenient factors for implementation.

- ❖ There still is a conflict between the Regulation No: 0204 and Agreement No: 0108. The Regulation No: 0204 stated that PFAs should not be located on the forest land, land use and agricultural land, which were already official handed to local villages. In opposite, PFAs possibly cover by the Agreement No: 0108. The change in this criteria is more likely to get confuse in the implementing. Possibly, PFAs could be covered all village's land if the Regulation for village resource management is revised and make it consistency with PFA obligation.

- ❖ The fourth criteria in the Agreement No: 0108 asserted that PFAs have to contain a timber production capacity at least 20% in the current and at least 60% in the future. It is accepted as a significant rule for the sustainable production management. Nonetheless, it is really not easy to identify the areas by just watching or observing forest covers. To producing and gaining a reliable measuring output and certifying the selected areas, it absolutely needs an intensive field surveys which might consume much more time and intensive finance.

- ❖ One of the site selection criteria of the World Bank suggested that PFAs should consists of relatively concentrated blocks of Evergreen/Semi-evergreen forests of >7,500 ha. Again, this is not easy to search for forest area which is matched. Most of forest in the proposed PFAs is significantly covered by Mixed Deciduous. Perhaps, Semi-evergreen might be understood as similar as Mixed Forest

- ❖ The third site selection criterion of the World Bank proposed is not suitable for the sustainable PFAs management for a long term. If it is used as a master criteria, it is a risk to the achievement. Nevertheless, it is suitable for the expansion of PFAs for the SUFORD project that have three year Implementing periods.

4

❖ In the last criteria suggested by the World Bank, it might not be appropriate to use for PFA selection. But it should be considered for the project management to concern in planning and operating processes. Even if it is used as the criteria, it seems to be difficult to indicate where matched area is.

5.   New PFAs Selection and criteria use

Base on the suggested criteria from the World Bank, the new sites selection for PFAs were determined in five provinces, including Xayabouly, Vientiane, Bilokhamsay, Sekong and Attapeu. These provinces are considered as having a high potential matching the suggested criteria of the project. These site identification were conducted by the Forest Inventory and Planning Division (FIPD) in collaboration with the Faculty of Forestry, NUoL. Data analysis was carried out using GIS applications based on below criteria:

1.   PFAs should not cover the Nation Conservation and Protection Forest Areas

2.   PFAs must be located far from the national boundaries at least 5 km

3.   It should be well-defined, easily-recognized boundaries; such as ridge-tops, rivers, roads and others.

4.   PFAs must contain relatively concentrated blocks of Evergreen/Semi-evergreen forests of >7,500 ha and slop degree <25 degree

5.   Forests must be within 15 km of existing district road and within 75 km by processing facilities.

6.   Blocks to constitute at least 40% of PFA

There are some criteria that are not able to use in the analysis by GIS. They are:

1.   PFAs should contain currently at least 20% harvestable area and at least 60% in future.

2.   PFAs must not cover forest, forestland and agriculture land that already provided to villagers for management and use (including land concession areas).

3.   The project is not restricting access to traditional resources or results in potentially negative impacts to local communities.

There are totally 13 out of 25 Production Forest Areas in five provinces which are the better suitable. The output of GIS analysis is not absolutely accurate due to a limitation of new data availability. For this analysis, landuse data interpretation from Landsat image in 2000 was used but field checks were not able to conduct. In reality, the forest cover and land used might already change. In addition, data input for the road networks was also out of date.

In addition, base on the attribute data from land use map of 13 PFAs, it is hardly to conclude that they are the most suitable site for the project and it is difficult to certify that the selected sites will contribute to the achievement of the project goal on the sustainable production forest management. Actually, in all PFAs, the Evergreen or Semi-evergreen are hardly found or even not found. A larger proportion of forest covers are classified as Mixed deciduous and Dipterocarps which might have less timber production capacity. Especially, in Phoutom and Huaysoup production forest in Bolikhamsay, the total areas are less than the project requires (12,179 ha & 8,590 ha). Their capacity is probably inadequate for the project needs. However, both of them could be contributed to support local benefits.

6.   The Selected PFAs in the Five Provinces

There are 13 PFAs within the five provinces which are considered as the most suitable due to the site selection criteria mentioned above. Those PFAs will be discussed in details as following:

6.1   PFAs in the Xayabouly Province

There are totally 6 Production Forest Areas proposed in Xayabouly. According to the site selection criteria of the World Bank, only 3 PFAs are the much more suitable for implementing PF within three years. They are Phanangnuan, Phouphadam and Phouphadeng. The following contexts explain their characteristics:

6.1.1 The Phanangnuan Production Forest Area

The total area of Phanangnuan PFA is 48,175 ha including 26,282 ha of Mixed Deciduous Forest (55%) and 19,122 ha of unstocked forest (40%) which have a high capacity to provide timbers. Moreover, there are ray and paddy rice covered 2,385 ha or 5% and 384 or 1% respectively. Forest area is scatted through the area and its capacity is high to generate a number of timbers for more than three years.

Figure 1: Map of Phanangnouan PFA, located between Xienghorn and Ngeun District.

Phanangnouan PFA is easy to access for all directions by the district roads. This PFA consists of several villages located in and surrounded, which will be easy to involve local participation.

6.1.2 Phouphadam PFA

The Phouphadam PFA is also selected. The total area is 95,225 ha, which is approximately 46,448 ha (48%) covered by dense forest. Phouphadam has high capacity to supply large proportion of forest timber products. The area is also combined by a large unstocked forest of 30,000 ha (32%), agriculture and grass land 1,183 ha (1,2%).
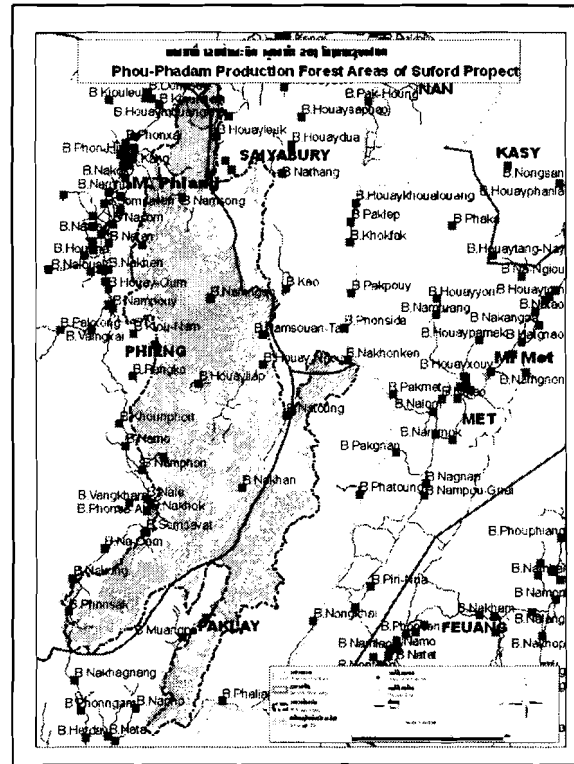
Figure 2: Map of the Phouphadam PFA, located in Paklay and Phieng District, Xayabouly Province

The geographic condition of the PFA is narrow and long. It covers three district; Paklay, Phieng and Xayabouly. The strengths of this PFA are easy to access by any side of the area and local communities are populated within and around the area that might be easy to encourage their involvement in the project implementation (Figure 2).

6.1.3 The Phouphadeng Production Forest Area

In the Xayabouly, the Phouphadeng Production Forest is regarding as the smallest (16,393 ha) comparing to those two PFAs. A capable extracting timber in this area is roughly 10,710 ha or 65 % of the total area. Secondary forest are about 4,156 ha or 25% and agricultural land is 867 ha or 5%. The rest is Dry Evergreen Forest.
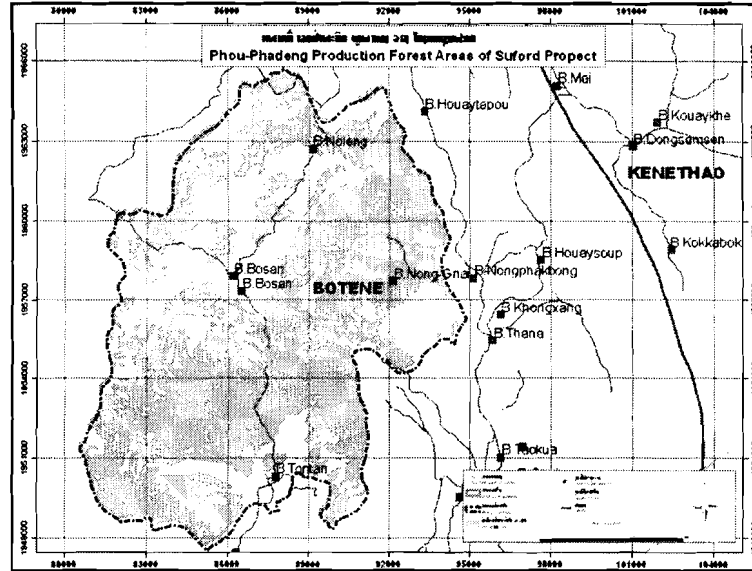
Figure 3: A Phaphadeng PFA map located in Botaen District.

The geographical shape of the Phouphadeng PFA is slightly rounded. The forest distribution in the west is likely scattered and less. The Phouphadeng PFA is a proper location to the project. It is convenient to access and located in only one province and there are not many villages concerned.

6.2 The selected PFAs in the Vientiane Province

Vientiane province is the closest to Vientiane Capital comparing to other five provinces. There are 6 proposed Production Forest Areas, but only 2 are marked as the better suitable for implementing Production Forest. Another PFA spreads around and not accessible. These two PFAs will be discussed as following:

6.2.1 Nongpet PFA

The total area of the Nongpet PFA is 68,725 ha, which consists of many types of forest. The forest cover is found all part of the area. Approximately 57,811 ha or 84% of the PFA would be able to supply a large proportion of forest timber products during the project periods. Other land use area is combined with fallow land, bamboo, grass and paddy rice.
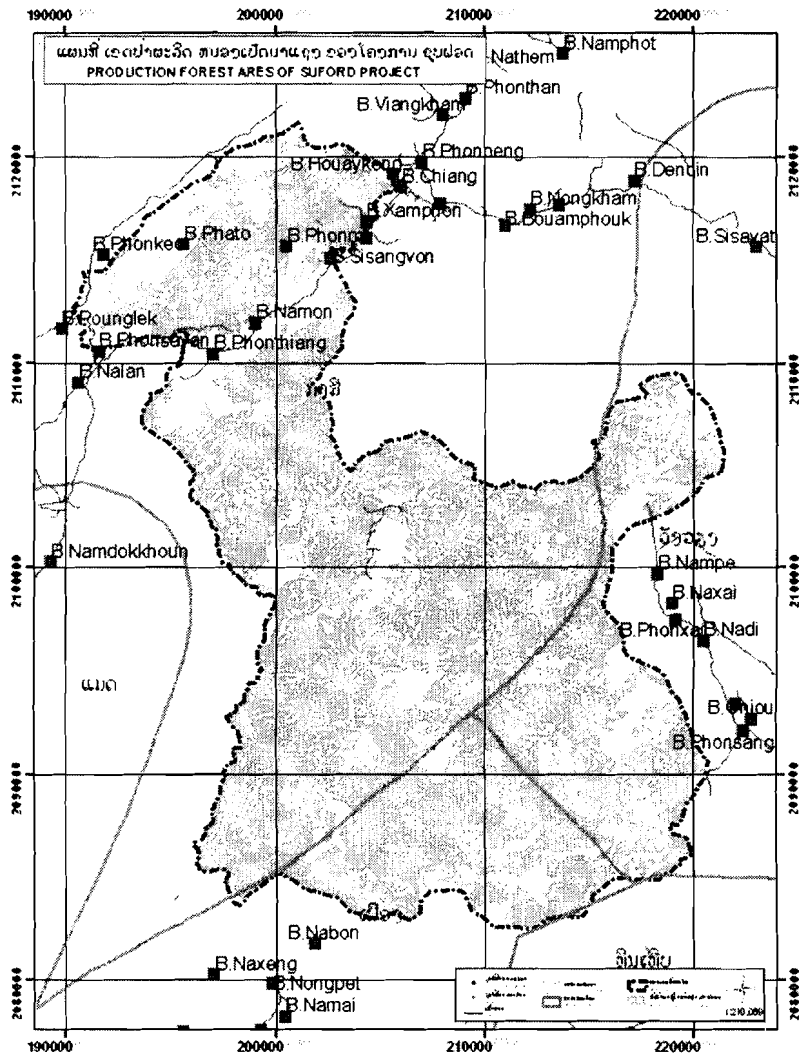
Figure 4: **Nongpet PFA, located in Kasy, Vangvieng and Feuang Districts**

6.2.2 The Phouyeuy PFA

The area of the Phouyeuy PFA is bigger than those of the Nongpet PFA. It has 100,228 ha in size. It covers by many forest types. The capability of timber supply is high. The mixed deciduous forest consists of 66,676 ha (67%). The timber extraction is supposed to be more than 3 years. Fallow land, bamboo, grass and paddy rice are also found in this area. The PFA is accessible along the borders under three districts; Sanakham, Feuang and Paklay District (figure 5).
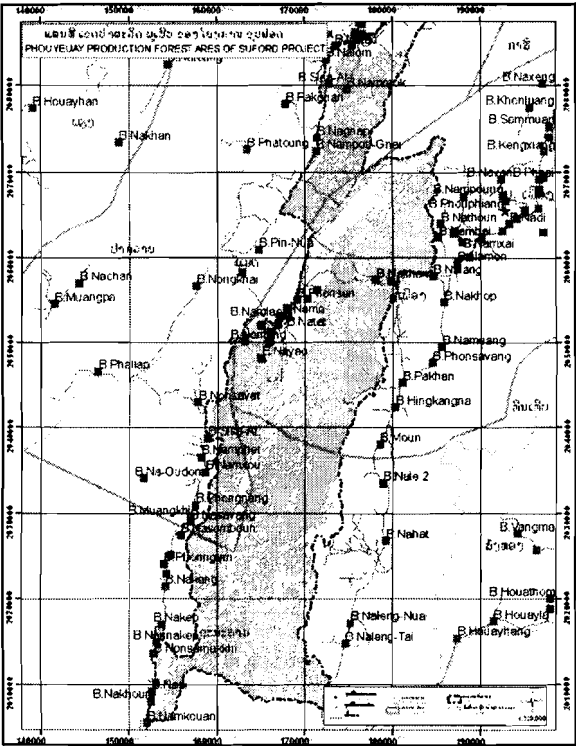
Figure 5: Map of Phouyeuy PFA with borders of Sanakham, Feuang and Paklay District, Xayabouly Province.

6.3 The selected PFAs in the Bolikhamsay Province

Bolikhamsay Province is one of the target provinces. There are 4 proposed Production Forest Areas, including Phoutom, Huaysoup, Phouxang and Phakbeuak PFA. Most of these are selected to be PFAs. These PFAs will be illustrated as following.

6.3.1 Phoutom PFA

The Phoutom is a small PFA with an area of 12,179 ha. However, only 5,761 ha (47%) of the total area is suitable to supply timbers. A proportion of bamboo area is a little bit larger with an area of 6,035 ha or 50%. Another proportion is mixed by agriculture land. The evergreen/semi-evergreen forest contained in the PFA is less

11

than the project requires. But, an accessibility of this location is much better due to many roads displayed around. Local participation might be easy found because several villages are surroundings. This PFA is not high priority if based on the World Bank criteria.
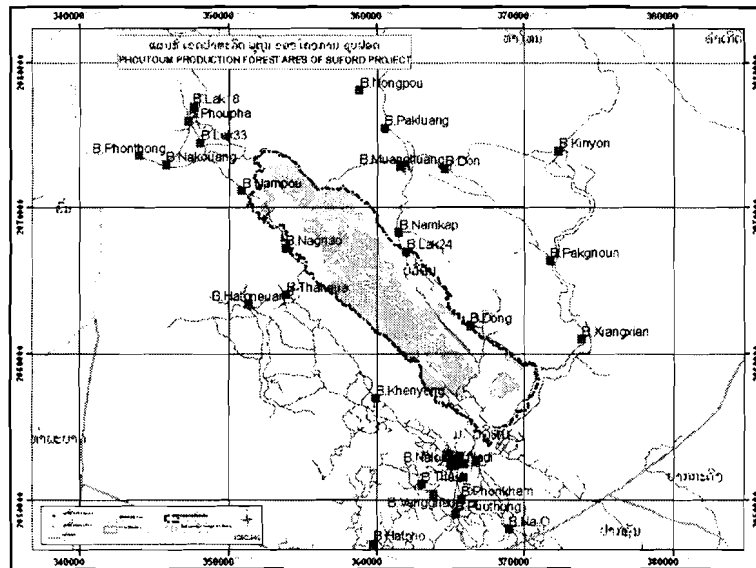
Figure 6: A map of Phoutom PFA, Bolikhan District.

6.3.2 Huaysoup PFA

The **Huaysoup** PFA is the smallest in comparison with those four PFAs. The total area is 8,590 ha and only 3,512 ha (about 41%) of Mixed Deciduous Forest and Dry Dipterocarp Forest 1,620 ha (19%) would be able to supply forest timber products. More than 35 % are fallow land, leaved and coniferous forest and scrub. According to the site selection criteria of the project, it is not high priority.

Figure 7: A map of **Huaysoup** located between Bolikhan, Paksan and Thaphabath District.

The accessibility to the PFA is regarding as less suitable, but it is located within 15km closed to the district (figure 7). Another limitation is selecting priority village involving in the project seems to be difficult because most of them located quite far away.

6.3.3 The Phouphaxang PFA

The **Phouphaxang** PFA covers larger area with a density of forest comparing to other two PFAs in Bolikhamsay. The total area is 47,657 ha, with approximately 21,561 ha or 53% of the PFA would be able to generate volume of forest timber products (Dry evergreen (15%), Dry dipterocarp 1% and Mixed Deciduous forest 37%). Other areas are fallow land and agriculture. The distribution of forest cover is less in the south.

A series of roads exiting in the North, South and Central part contributes to easier accessibility to the area. There are many villages located in and around the PFA, then they are easy to get involvement.

Figure 8: Map of the **Phouphaxang** PFA, Bolikhan District.

6.3.4 Phakbouak PFA

The **Phakbouak** PFA is considered as the biggest in comparison with other PFA in the five provinces. Its total area is 112,756 ha. The forest covers through the area. The timber exploitation could be carried out with 88, 575 ha or 79%. The rest are unstocked forest and ray.

Figure 9: A map of **Phakbouak** PFA

In general, the **Phakbouak** PFA is a proper and convenient to access, except Khamkeut district. It has borders with many districts such as Bolikhan, Khamkuet, Pakading and Paksan. The distance between districts might create constrain in effective collaboration among them.

6.4   The selected PFA in Sekong province

The use of the project's site selection criteria to locate a suitable area for the implementation of the PFA limits a number of unsuitable areas in Sekong. Only one forest land could be identified for the project. Huaypen PFA. Another PFA located in this province is less forest cover, small area and scattered. Some area is combined by a various young forest and fallow land, which is not the project requires. The total area of the Huaypen production forest area is about 89,352 ha with roughly 49,133 ha (55%) of forest area that can produce timbers. The Huaypen PFA contains many type of forest. A majority is Mixed deciduous and Dry dipterocarp Forest. The rest is combined by bamboo, fallow, grassland and ray.
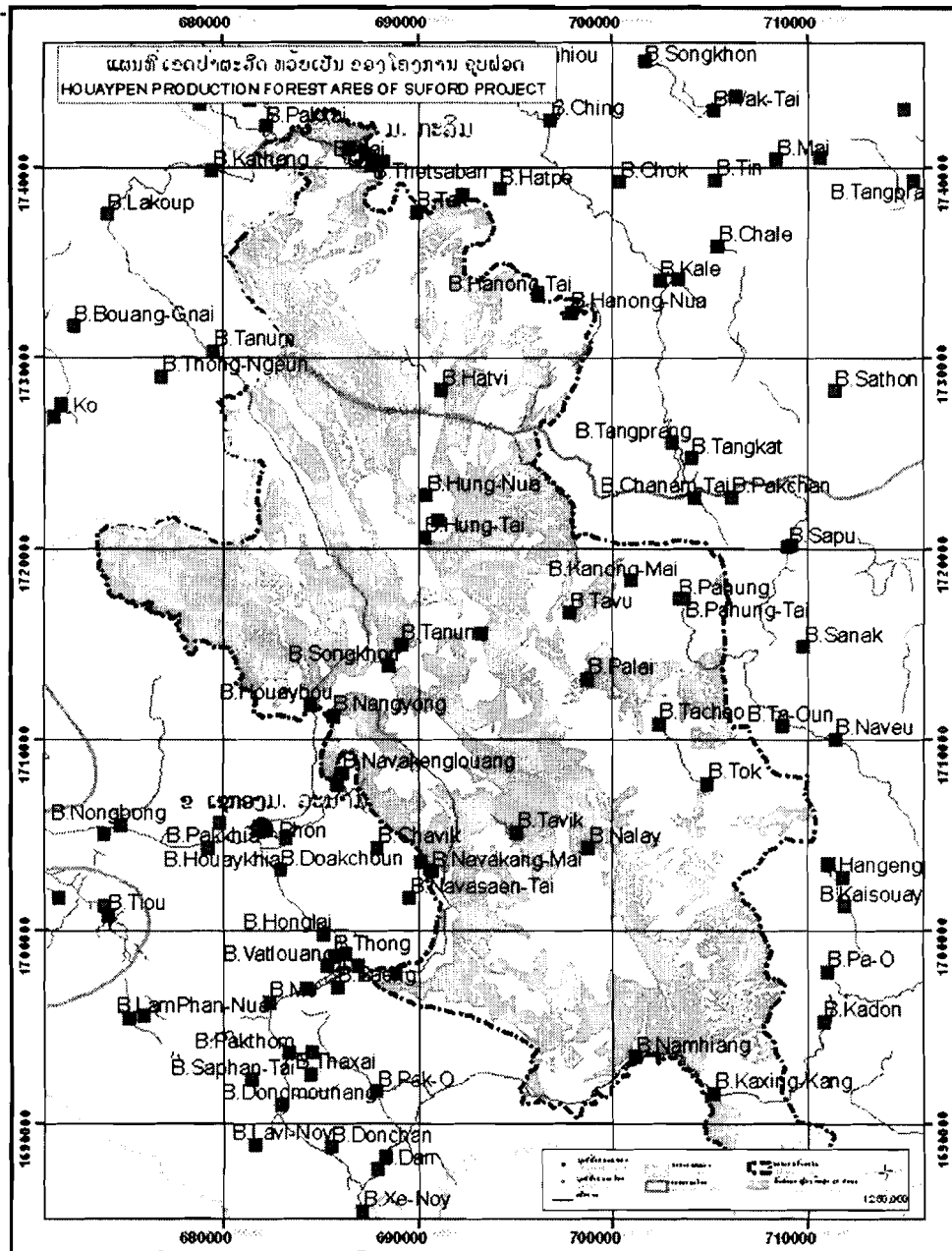
15

Figure 10: Map of the **Huaypen** PFA located between Lamam and Kaleum district.

The forest is large patches and distributed, but there is a less distribution in the North and East. It is not too difficult to access to the area (Figure 10). There are many villages located in the PFA and surrounding.

6.5 The selected PFA in Attapeu Province

All of the three PFAs in Attapeu are selected to be for the project. They are the Ban Vilay, Namkong and Nampa PFA.
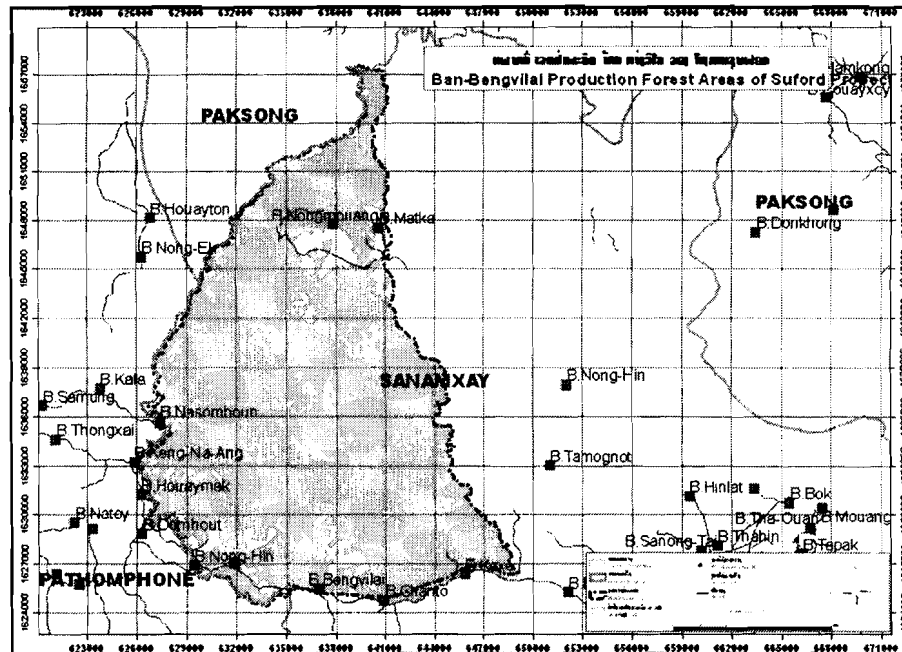
6.5.1 Ban Bengvilay PFA

Figure 11: A map of the Ban Bengvilay production forest, Xanamxay district.

The Ban Bengvilay Production Forest is the smallest PFA in Attapeu with an area of 37,862 ha. About 93% (35,089 ha) of the area could produce desired timbers. Small proportion of it is made up by fallow, ray, savanna, swamp, water and paddy rice. There are roads surround the area, especially in the South and West, but other parts are likely problematic. Villages are established around the PFA, there is only two village located inside, one in the north and the other in the south.

6.5.2 Namkong PFA

It is the largest production forest area in Attapeu. It covers 116,730 ha of the total land. About 52 % of the forest land would enable to generate timbers. The forest area is spread in the East, but there is less in the West. The area is easily accessible because many roads are connected. The possible villages involving are under the Phouvong and Xanamxay district.
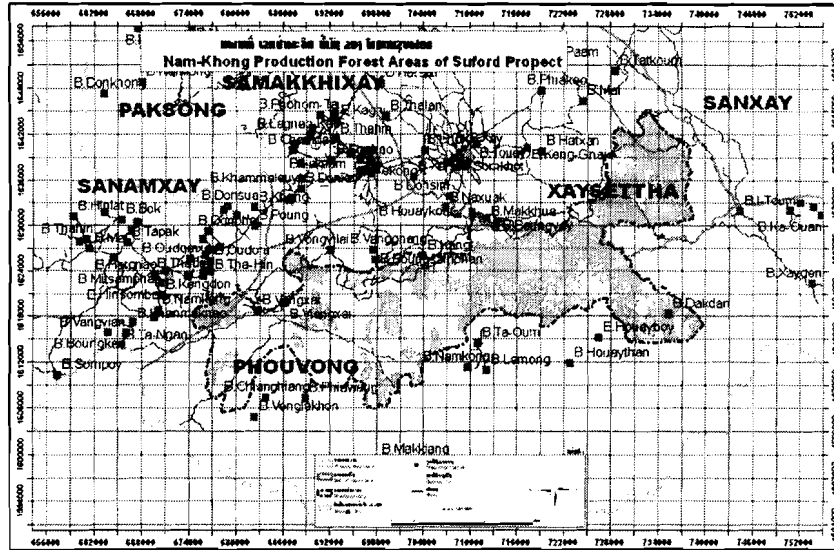
Figure 12: A map of Namkong PFA, Phouvong and Xanamxay district.

6.5.3 The Nampa PFA

The Nampa PFA is a second largest, which covers 75,037 ha following Namkong PFA. Density of forest area is 51,689 ha or 70 % would be able to supply timber products. Other areas are bamboo, fallow land and agriculture land. The distribution of forest cover is concentrated in the West.
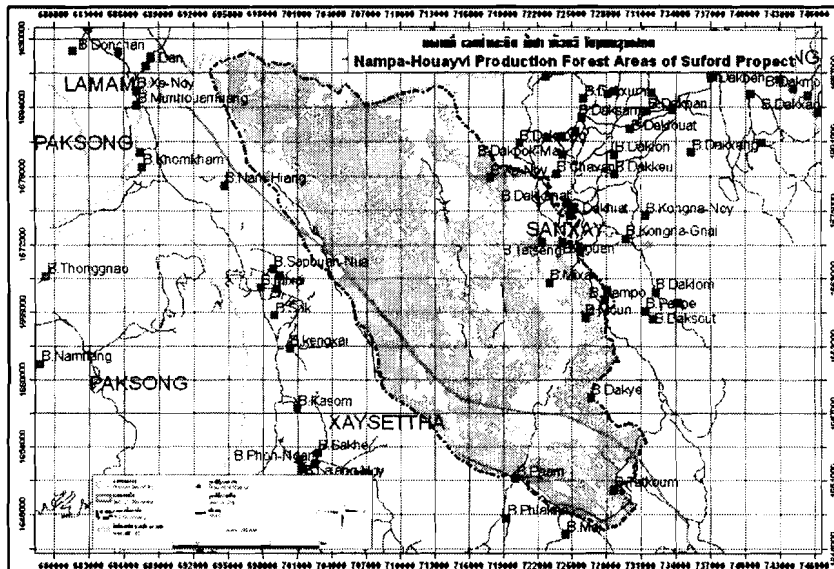

Figure 13: Map of Nampa PFA located between Xansay and Xaysetha district.

18

The Nampa PFA is located between Xansay and Xaysetha district. The accessibility of the PFA is very convenient in all parts.

7. Identifying the priority villages to involve in the project implementation

In general, the PFAs cover several village land. Those villages might be allocated inside, along the PFA boundaries or outsides. The PFA management and planning should consider the traditional resource uses of those village in order to ensure coordination and participation from local people. Perhaps, the village selection approach of the Lao-Swedish Project to identify target villages involving in the project should be applied (Lao-Swidd, 2001). They selected villages based on four criteria as explained as below:

❖ Village Type 1: The village located in; its location and land use are in the project area.

❖ Village Type 2: The village which is located outside the project area, but village land use located in side.

❖ Village Type 3: The village that its forest area and forestland are located around the project area.

❖ Village Type 4: The village that located far from the project area, but they have tradition using resource in the project area.
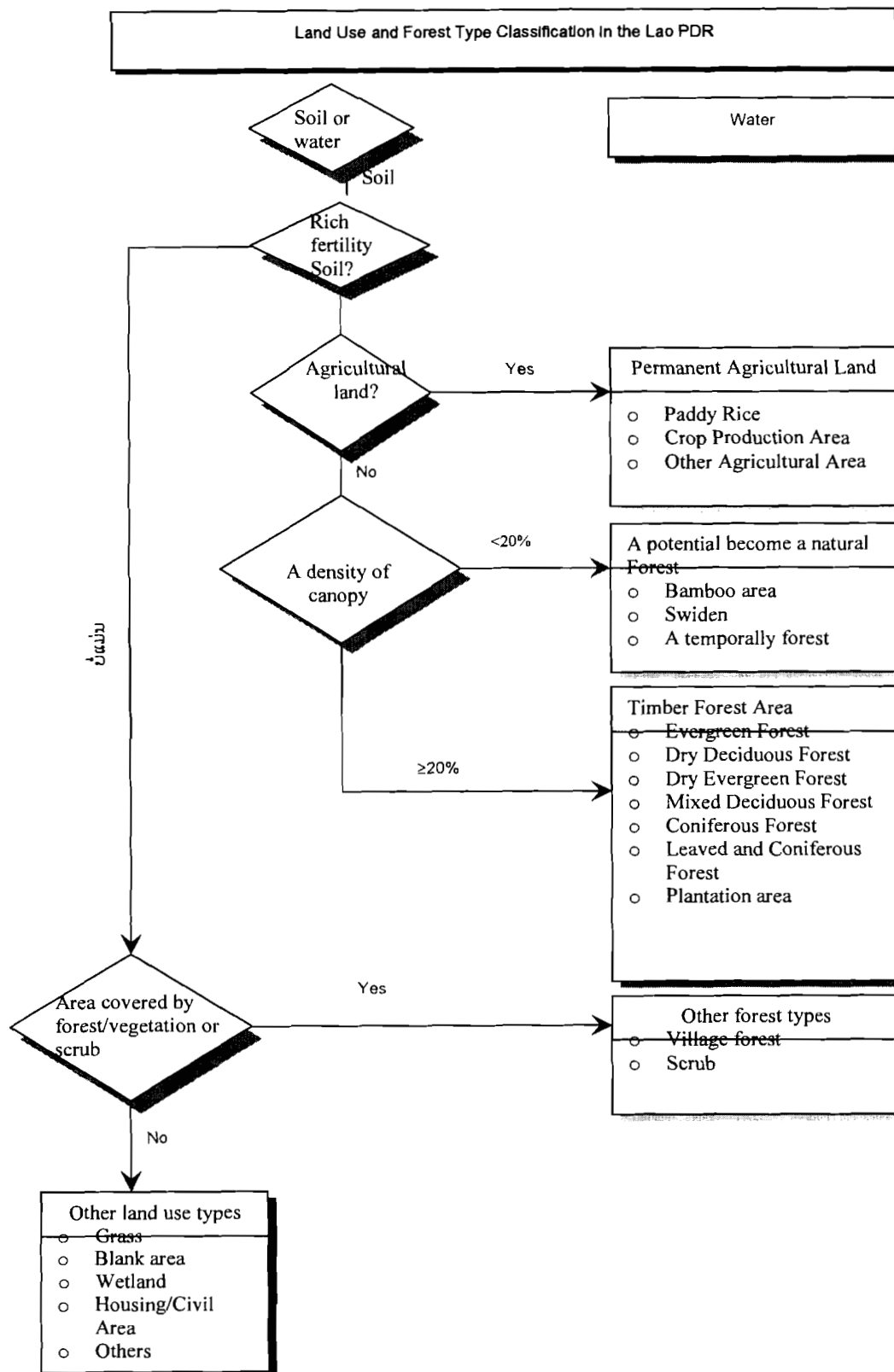
8. Conclusion

It can be concluded that the Regulation concerning the PFAs identification provides appropriate basic guideline for criteria development. However, the criteria is not well consistency with the existing Regulation which needs a further improvement. In order to improve the criteria, it needs detail study in assessing the limitations and constrains from the previous practices.

The suggested criteria of the World Bank might not be suitable to be the standardization for the long term management as it targets for the project implement in three year period only. However, it is necessary for the new PFA to be designed for operation under SUFORD project to effectively manage by the project commitment.

There are 13 selected PFAs out of 25 PFAs proposed in five provinces. Those selected PFAs were identified based on the suggested criteria from the World Bank as well as the criteria developed by MAF. It is necessary to conduct field checks before summiting for the final approval because the information and data to be used for the analysis are rather out of date.

Appendix1:

Land Use and Forest Type Classification in the Lao PDR

```
   Soil or                              Water
   water
        Soil

   Rich
   fertility
   Soil?

   Agricultural        Yes       Permanent Agricultural Land
   land?                         ─────────────────────────────
                                 o   Paddy Rice
        No                       o   Crop Production Area
                                 o   Other Agricultural Area

   A density of       <20%       A potential become a natural
   canopy                        Forest
                                 o   Bamboo area
                                 o   Swiden
                                 o   A temporally forest

                                 Timber Forest Area
                                 ─────────────────────────────
                                 o   Evergreen Forest
                     ≥20%        o   Dry Deciduous Forest
                                 o   Dry Evergreen Forest
                                 o   Mixed Deciduous Forest
                                 o   Coniferous Forest
                                 o   Leaved and Coniferous
                                     Forest
                                 o   Plantation area

   Area covered by    Yes        Other forest types
   forest/vegetation or          ─────────────────────────────
   scrub                         o   Village forest
                                 o   Scrub

        No

   Other land use types
   ─────────────────────
   o   Grass
   o   Blank area
   o   Wetland
   o   Housing/Civil
       Area
   o   Others
```

21

Forest Definition:

- Forest will include all of natural forest and plantation area which its canopy density cover is more than 20% with an area of over 0.5 ha
- High of tree is at least 5 meters
- If any area used to be a primary forest, but currently its canopy density is less than 20% resulting from many factors (i.e. shifting cultivation or timber exploitation), this area will be classified as a potential forest or degraded forest area.
- If the scrub and under canopy vegetation located in infertility soil with less than 20% of canopy cover, this area will be classified as other forest types

Dry Evergreen Forest

Dry Evergreen Forest consists of less number of evergreen tree species than those found in the evergreen forest. Usually, evergreen tree covers between 50% and 80% of the area. However, bamboo is sometimes found in those areas of dry evergreen forest that used to be cleared. The topsoil is considered as langer and hardwood tree species such as Hopea spp, Pterocarpus pelatus), Dipterocarpus alatus, Anisoptera spp or Lagerstroemia spp are normally found in this forest type. If this dry evergreen forest is located more than 200 m of elevation, it is called the upper dry evergreen forest. In opposite, if it is less, it is lower dry evergreen forest. This forest type is combined by a dense under canopy/vegetation and 10-30 m of timber trees.

Mixed Deciduous Forest

Mixed deciduous is covered by more than 50% of deciduous tree species and a density of its

understoy is less than those of evergreen forest. Bamboo is also combined. If an elevation this forest type is located at 200 m is classified as *upper mixed deciduous forest* and if it is less, it is called *lower mixed deciduous forest*.

Dry Deciduous Forest

Dry Deciduous Forest is found in the dry area or opened land. A diameter of appeared trees is not very big with between 8-25 m in high. Its canopy of those tree species is not very wide. Dry Deciduous Forest is often found in unfertilized soil and the top soil is moderately thin. But if it is gown in a fertilized soil, its stem appears bend and not more than 10 m in high. These following tree such as Dipterocarpus intricatus, Shorea obtusa, Dipterocarpus obtusifolius), Terminalia tomentosa, and Shorea siamensis are found. If a canopy of these trees is less than 20%, it is defined as sparse deciduous forest.

Riparian Forest

Riparian is possibly combined by evergreen or deciduous forest. But method used to classify this type of forest is based on other land use surrounding such as village, rice field and others. A width of riparian forest is not more than 100 m.

23

Coniferous Forest

It hardly finds its understory vegetation in coniferous forest, but there is sometimes a small generation plant to become a secondary forest. Coniferous forest is normally found in a high altitude and lower temperature area. It is mixed by coniferous tree family such as Pinus kesiya or Pinus merkusii), Fokinia sp and Cunninghammia.

.

Mixed broadleaved and coniferous forest

Mixed broadleaved and coniferous forest is the forest which is combined by both broadleaved and narrow tree species. It is consists of deciduous and evergreen trees. It is usually found in a high elevation.

Plantation
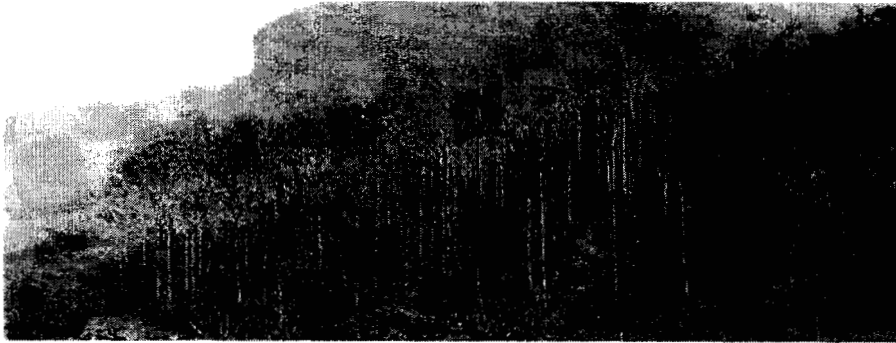
Plantation area is comprised by even-aged stands with the same height and equal planting distance (equal spacing). Although a small even-aged tree and its canopy cover is less than 20%, it is still considered as plantation. Rubber is classified as plantation, but coffee and tea crop area are not included in plantation definition.

Bamboo

If an area is covered with bamboo and the overstory has a crown cover of less than 5%, it should be classified as bamboo and If the bamboo represents less than 80% of the total vegetation cover of the understory, the vegetation type should not be classified as bamboo.

Degraded Forest
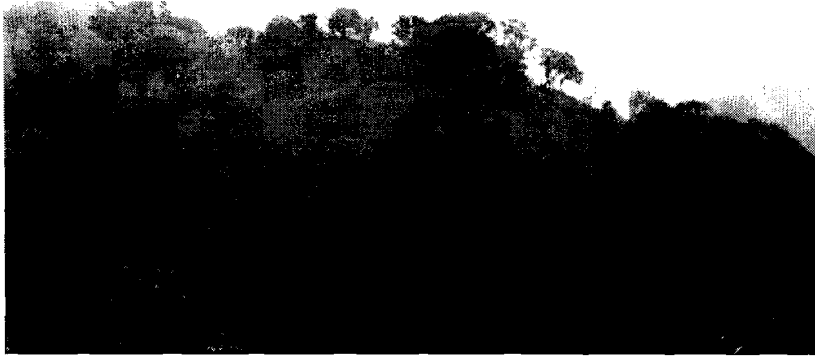
Degraded forest is degraded land or forest which is under 20% of density of canopy cover resulting from timber exploitation, shifting cultivation or other human disturbance activities. It is sometimes dependant on a level of disturbance, if there is not much further destruction, a degraded forest might recover itself and becomes a potential forest in the future. On the other hand, if a degraded forest is covered by abandon grass, it is less capacity to recover and becomes a natural abandon forest again.

Ray (Shifting Cultivation Area)

Ray or Shifting Cultivation Area is the forest which is a slash-burnt area clearing for swiden cultivating or other crop production. If a slash-burnt area is left for a year, it is defined as degraded land and if more than 2 years, it is called fallow land.

Sparse Deciduous forest

Sparse Deciduous forest is considered as a less fertilized area which is suitable for neither plantation nor agricultural production. The tree cover is at least 1% to not more than 20% of the total area. Trees found in this area are high capable to retain and prolong with a dry condition. Sparse deciduous forest is not in the high steep area. It is often found in low land which should not be confused with sifting cultivation area covered by grass.

Scrub

Scrub consists of low trees and blushes, especially in an area that has rocks, shallow topsoil and very little rain.
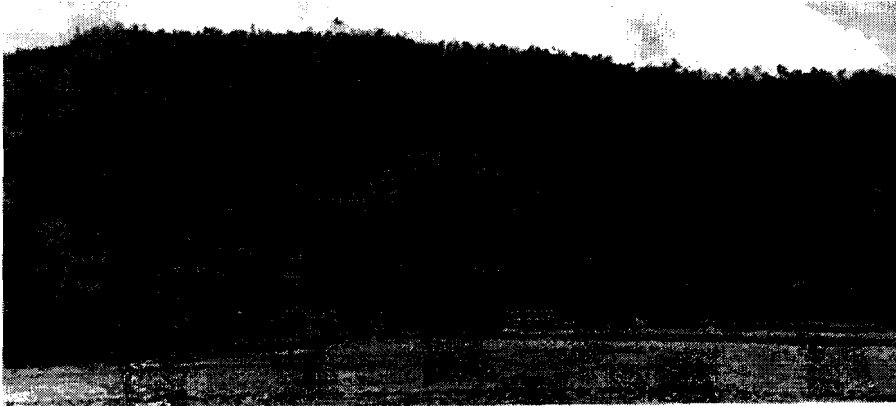
Paddy Rice
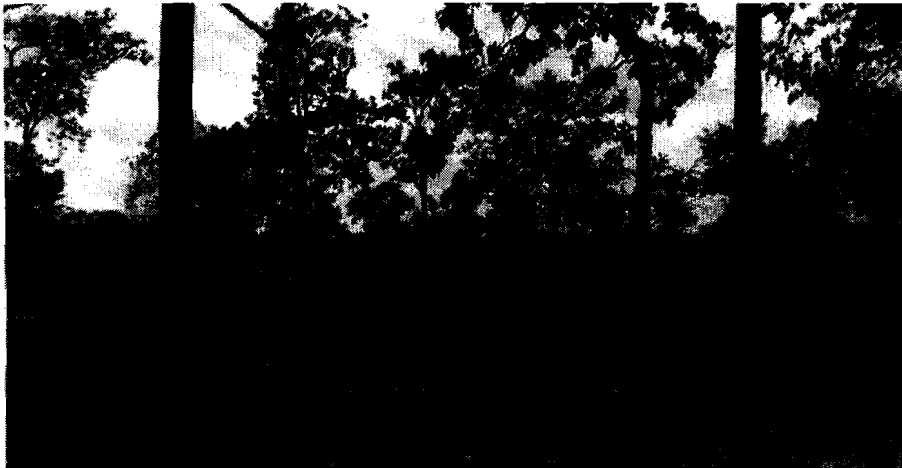
Paddy rice is a permanent rice production area. If paddy rice area is not current cultivated and left more than a year, it is not classified as paddy rice.

Agricultural Land

It is an agricultural area which is used for crop production such as vegetation, fruit trees, coffee, tea crop, tobacco and others excluding rice production.

Other crop production area

It is an area used for other agricultural production activities such as grass land. However, if a canopy of tree in a grass land is more than 20%, it is called forest.

Barren Forest

It is a serious degraded land which is less topsoil. Stones or small rocks and grass are integrated in this area.

Grass Land

It is also a degraded area with no tree or scrub or blushes. In other word, it is a dry condition area which is covered by grass. It might used to consist of trees destroyed by fire (using fire for hunting). Grass land is often found in upper land in the Northern. This area has deep topsoil with high moisture.

Wetland
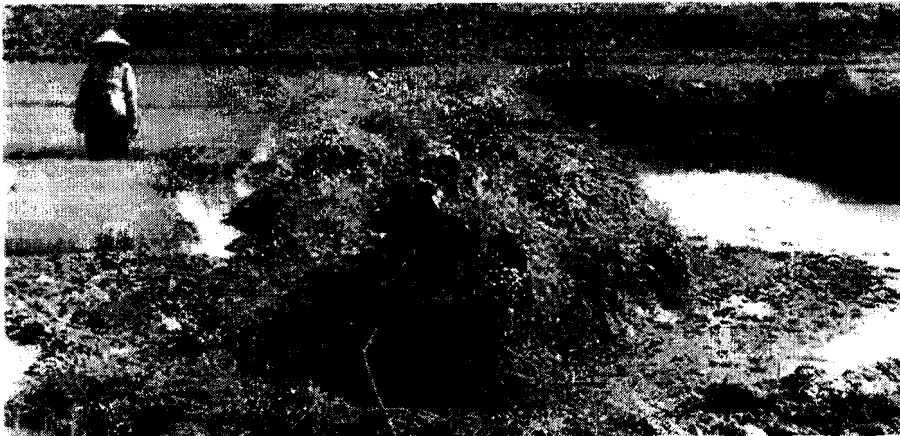
Wetland is a land area mixed by water which is reached the moisture or water content. It is possibly rich in soil fertility, but as a result of inadequacies of oxygen (O_2), it is not suitable for agricultural purposes. However, wetland plays an important role in ecosystem and environment. It is rich in vegetation or plant species and wild animals.

ພືດ ທີ່ເປັນຄຸນລັກສະນະ ໃນເຂດດິນຫານ ໄດ້ແກ່ ພວກຕົ້ນໄຄ້, ຜັກກູດ ແລະ ອື່ນໆ.

Urban or Built Up Area

Urban or Built-up Area will include permanent houses and other constructions such as village, urban area, park and so on. It also includes road which is over 5 m in length and electricity connecters, but it is only excludes rice field which under electricity networks.

Other land uses
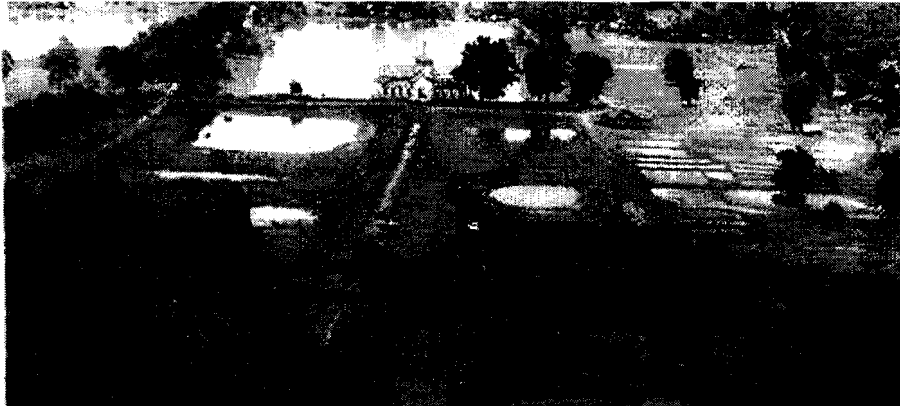
It is an area which is not included in any land use type such as temple or cultural and historical sites.

Water

Water includes river, reservoir, pond and irrigation channel. An area of over 0.5 ha with 10m of width of reservoir and pond will be classified as water, but if it's less, it should be categorized into other types of land use.

Annex 1 Proposed final inclusion of PFAs in SUFORD AF based on the Final Feasibility Study (22 July 2008)

No.	PFAs	Total Area [Ha]	Forest area under slope < 25% [Ha]	Province	Districts	No of district
1	Phanangnuan	48,174	26,282	Xayabouli	Xienghone	1
2	Phouphadam	95,224	46,447	Xayabouli	Paklay, Xayyabouly, Phieng	3
3	Nongpet	61,314	46,069	Vientiane	Kasy, Vangvieng, Phueang, Met	3
4	Phouyeuy	107,644	68,331	Vientiane	Sanakham, Met, Phueang	2
5	Huaypen	91,853	31,334	Sekong	Kaluem, Lamam	2
6	Phouxang	47,069	23,923	Bolikhamsay	Bolikhan	1
7	Phakbeuak	110,706	87,549	Bolikhamsay	Bolikhan, Pakading, Viengthong	2
8	Ban Bengvilay	37,862	30,991	Atapue	Sanamxay	1
9	Nampa	75,037	46,952	Atapue	Saysetha, Phuvong	2
	Total	**674,883**	**407,878**			**17**

Location	PFA name	Numbers of villages			Forest Type	Area (ha)	Percent (%)
		from socio-economic survey	Within PFA boundary	Including outside boundary 5 km			
1.Xayabounli Province	1. Pha- NangNuon PFA (Xienghon District)	15	16	35	Mixed Deciduous Forest	26,282	55
					Unstocked Forest	19,122	40
					Ray	2,385	5
					Rice Paddy	384	1
					Grand Total	48,174	100
	2. Phou PhaDam PFA (paklai,Phieng and Xaiyabounli Districts)	34	13	61	Mixed Deciduous Forest	46,448	48
					Dry Dipterocarp Forest	5,472	6
						12,053	13
					Unstocked Forest	30,000	32
					Ray	831	1
						70	0
					Rice Paddy	341	0
					Grass Land	10	0
					Grand Total	95,225	100
	3. Phou Phadeng PFA (Botene District)	8			Dry Evergreen Forest	589	4
					Mixed Deciduous Forest	10,710	65
					Dry Dipterocarp Forest	71	0
					Unstocked Forest	4,156	25
					Ray	302	2
					Rice Paddy	565	3
					Grand Total	16,393	100
2.Vientiane Province	1. Phou Nneuy PFA (Sanakham,Met and Feuang Districts)	31	19	54	Dry Evergreen Forest	7	0
					Mixed Deciduous Forest	66,676	67
					Bamboo	9,563	10
					Unstocked Forest	21,410	21
					Ray	862	1
					Scrub	105	0
					Rice Paddy	1,007	1
					Grass Land	599	1
					Grand Total	100,229	100
	2. Codengpet-Naseng PFA (Vangvieng,Met,kasi and Feuang Districts)	19	2	27	Mixed Deciduous Forest	57,811	84
					Bamboo	3,692	5
					Unstocked Forest	6,324	9
					Ray	419	1
					Scrub	39	0
					Rice Paddy	410	1
					Rock	30	0
					Grand Total	68,725	100

Location	PFA name	Numbers of villages			Forest Type	Area (ha)	Percent (%)
		from socio-economic survey	Within PFA boundary	Including outside boundary 5 km			
3.Bolikhamxay Province	1. Houay- Soup PFA (Bolikhanh and Paksanh Districts)	5			Mixed Deciduous Forest	3,512	41
					Dry Dipterocarp Forest	1,620	19
					Mixed Broad Leaved andConniferous	965	11
					Unstocked Forest	2,436	28
					Scrub	57	1
					Grand Total	**8,590**	**100**
	2. Phou Toum PFA (Bolikhanh Districts)	5			Mixed Deciduous Forest	5,761	47
					Unstocked Forest	6,035	50
					Ray	199	2
					Rice Paddy	33	0
					Rock	34	0
					Water	117	1
					Grand Total	**12,179**	**100**
	3. Phou Pasang PFA (Bolikhanh Districts)	10	14	6	Dry Evergreen Forest	7,059	15
					Mixed Deciduous Forest	17,922	37
					Dry Dipterocarp Forest	246	1
					Unstocked Forest	21,747	46
					Ray	531	1
					Rice Paddy	144	0
					Water	8	0
					Grand Total	**47,657**	**100**
	4. Park Bouak PFA (Bolikhanh Pakkading and Vienthong Districts)	14	2	20	Dry Evergreen Forest	16,988	15
					Mixed Deciduous Forest	71,587	64
					Unstocked Forest	21,906	19
					Ray	1,921	2
					Savanna	252	0
					Grass Land	101	0
					Water	1	0
					Grand Total	**112,756**	**100**
4.Xekong Province	1. Houay Pen PFA (Lamarm and Kaleum Districts)	25	25	45	Dry Evergreen Forest	33	0
					Mixed Deciduous Forest	29,878	33
					Dry Dipterocarp Forest	19,255	22
					Bamboo	813	1
					Unstocked Forest	32,940	37
					Ray	1,084	1
					Scrub	190	0
					Rice Paddy	54	0
					Urban or Built up area	2	0
					Grass Land	5,284	6
					Grand Total	**89,532**	**100**

Location	PFA name	Numbers of villages			Forest Type	Area (ha)	Percent (%)
		from socio-economic survey	Within PFA boundary	Including outside boundary 5 km			
5.Atapue Province	1. Bengvilai PFA (Sanamxay District)	6	7	3	Mixed Deciduous Forest	29,930	79
					Dry Dipterocarp Forest	5,159	14
					Unstocked Forest	2,376	6
					Ray	112	0.29
					Savanna	43	0.00
					Rice Paddy	144	0.00
					Swamp	64	0.00
					Water	34	0.00
					Grand Total	37,862	99
	2. Namkong PFA (Xaysetha and Phouvong Districts)	23			Dry Evergreen Forest	6,148	5
					Mixed Deciduous Forest	53,273	46
					Dry Dipterocarp Forest	1,656	1
					Bamboo	2,160	2
					Unstocked Forest	44,005	38
					Ray	223	0
					Savanna	1,945	2
					Rice Paddy	949	5
					Grass Land	6,372	6
					Grand Total	116,730	100
	3. Nampa Houayvi PFA (Sanxay and Xaysetha Districts)	27	9	22	Dry Evergreen Forest	10,640	14
					Mixed Deciduous Forest	36,014	49
					Dry Dipterocarp Forest	5,035	7
					Bamboo	4,787	6
					Unstocked Forest	11,792	16
					Ray	981	1
					Savanna	997	1
					Rice Paddy	17	0
					Grass Land	4,694	6
					Urban or Built up area	80	0
					Grand Total	75,037	100